

BALL (F. P.)

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AND DIPHTHERIC CROUP, AND THE  
VALUE OF INTUBATION.

BY

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**REMARKS ON PSEUDO-MEMBRANOUS CROUP  
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VALUE OF INTUBATION.<sup>1</sup>**

BY FRANCIS P. BAILL, M.D.,  
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THE two principal points which I think we should consider and discuss to-day are the identity or non-identity of diphtheric croup and pseudo-membranous croup and the value of intubation in these cases.

When we consider the wonderful advances made in bacteriology in the past few years, and the ability of the bacteriologist to designate the exact microorganisms which are the cause of many diseases, and especially when we remember that the specific microorganism of diphtheria is a well-recognized bacterium, it would seem as though the first proposition for discussion were useless; for the presence or absence of that bacterium should settle the question as to the identity of the two diseases. But such is not the case. A review of the literature of the subject will show quite a diversity of opinion on this point, with an array of substantial reasons, both for and against the opinion.

In France, where diphtheria was known and

<sup>1</sup> Read before the Clinton County Medical Society, August 15, 1894.



studied long before it was recognized in England or in this country, writers on this subject, I believe, are almost a unit in their belief that all cases of laryngeal croup are diphtheric; and their writings and experiences have had an effect upon the Germans, who hold the same belief; and to some extent, though not so universally, upon the English, many of whom also believe in the identity of the two diseases. Mackenzie refers to the influence of the experience of the French in his argument supporting the unity theory, and gives them the credit just referred to.

In this country, however, pseudo-membranous laryngitis was recognized as a well-defined pathologic condition, its clinical features carefully observed and accurately recorded by competent physicians long before diphtheria invaded our land. As remarked by J. Lewis Smith, it is impossible to suppose that all these cases coming in the hands of able practitioners, as they did, should have been examples of unrecognized diphtheria primarily affecting the windpipe, and none of them showing the symptoms of faucial diphtheria. It is impossible to suppose that so many able observers should have been so completely deceived in their clinical study of the disease, and it is also impossible to suppose that so many cases as are recorded and were under observation should have been primary laryngeal diphtheria, for we know that it is not by any means the rule, nor does it occur in many cases, that the diphtheric pseudo-membrane forms primarily in the larynx. The result of the early experience and study of membranous croup, when



diphtheria was an unknown disease in this country, has, I suppose, had much to do with the faith many American physicians have in the dual theory. And this early experience is to me a strong argument in favor of that theory. It is no argument to the contrary to say, as is so often done, that, because croup has increased vastly in numbers of cases since diphtheria was introduced into this country, therefore diphtheria is the sole cause of croup. It only argues that diphtheria is another factor in the production of croup, and that the larynx is only another field for the development of the diphtheric membrane. But it would seem as though the careful bacterial study of these cases should elucidate the point which has been discussed by many writers, and settle it beyond dispute. As Osler remarks, work in this field is very much needed.

The Klebs-Loeffler bacillus is the bacterium of diphtheria, and is found in all cases of diphtheric croup. When found, therefore, in any case of membranous croup, it of course proves the disease to be diphtheric. But it is not found in the fibrinous exudation of membranous croup. There are various cocci found, the staphylococcus and streptococcus, and among others the streptococcus pyogenes, but not the true bacterium of diphtheria.

If this proposition can be established, if it can be shown that in a certain class of cases the Klebs-Loeffler bacillus does exist, and in a certain other class it does not exist, there should be little difficulty in settling the question of identity or non-identity of the two diseases. The anatomic appearances of the two diseases are so nearly identical that

if there is any difference it is not distinguishable, and unless they can be differentiated bacterially, as suggested, the question of unity must still remain open.

I find recently published the following results of the work of different observers bearing on this point of the bacteriology of diphtheria, which in this connection lead to interesting conclusions: Baginsky, of Berlin, examined 154 cases of diphtheria, and found the Klebs-Loeffler bacilli in 118, and none in the other 36. Prudden, of New York, examined 24 cases of diphtheria, complicating or following scarlet fever, and found no Klebs-Loeffler bacillus. Martin examined 200 cases, and found the characteristic bacillus in 121, leaving 79 without the diphtheric bacterium. Park, of New York, found it in 129 cases, and absent in 79. Thus, in a total of 534 cases of what was diagnosticated as diphtheria by different observers, the Klebs-Loeffler bacillus was present in 366 and absent in 168. With this array of cases, and their bacteriologic examination before us, let us refer to the rules formulated by Koch for the establishment of a complete chain of evidence as to the production of a disease by any special micro-organism. They are as follows, viz. :

1st. The presence of the organism in all cases of the disease, and in such distribution as will explain the lesion.

2d. The isolation of the organism in pure culture.

3d. The reproduction of the disease by inoculation with the isolated organism, and the presence of the latter in the tissues of the inoculated animal.

It is only necessary to apply the first of these rules to the foregoing cases to force us to the conclusion that we either have two diseases diphtheric in character, but quite different in their bacteriology, or that the Klebs-Loeffler bacillus is only accidentally present, and has really nothing to do with the case.

Few of us, I think, would have the temerity to assert that the latter part of the proposition is correct, and consequently we must conclude that there are two diseases diphtheric in nature and very similar in their manifestations, yet differing quite materially in their bacteriology; the one a contagious disease, the other not, and, as has been shown in a further report of the cases referred to, the one a much milder disease and more prone to recovery.

The existence of two diseases having the same physical appearance but differing in their bacteriology, the one a true diphtheria, and the other a false diphtheria, has been recognized lately by the Chief of the Bureau of Bacteriology of Brooklyn, and the difficulties of diagnosis have been acknowledged to the extent of establishing a method of bacteriologic examination of all cases of suspected diphtheria at public expense. In a recent journal I find that this Bureau of the Department of Health of Brooklyn recognizes the fact that

“Recent bacterial investigations have shown that a considerable proportion of the cases of pseudo-membranous and exudative inflammations of the throat and upper air-passages, commonly considered as diphtheria, and having the anatomic appearances found in diphtheria, are not true, but false diphtheria. On the other hand, it has been shown that a considerable proportion of the cases which are apparently false diphtheria prove

on bacterial examination, to be true diphtheria. While in true diphtheria the mortality is very high and the danger of transmission to others is very great, in false diphtheria the mortality is low and the danger of infection slight."

These statements and the recognition of a true and a false diphtheria, the one a disease in which the Klebs-Loeffler bacillus is found, and the other in which various microorganisms, but not the diphtheric bacterium, are found, may account for a statement often made to me by a member of this Society, that in Kansas, where he formerly practised, his cases of diphtheria were much milder and the recoveries more frequent, so that death was seldom expected from a case of diphtheria in that locality. Such cases did not differ in their physical aspect from the diphtheria seen elsewhere, and which is so much more fatal, but no doubt would have differed very essentially if examined bacterially.

If it is true that there is a true and a false faucial diphtheria, are we not justified in the belief that there is also a non-identity of the two diseases under discussion; or, to be more moderate, are we not correct in at least considering the question still open? The truth is that the number of cases of laryngeal croup examined for the purpose of elucidating this point is yet too small for positive conclusions, and it is a matter of surprise that there has not been a greater amount of investigation on this subject by bacteriologists. The question of the bacteriology of the disease seems to me in our present knowledge to settle down to the statement, the author of which I cannot now recall, viz: "If the



Klebs-Loeffler bacillus be accepted as a *sine qua non* in the etiology of diphtheria, then croup (pseudo-membranous laryngitis) must necessarily be separated from it." Clinically, there is a difference in the symptomatology of the two diseases more easy to describe than appreciate, but the dissimilarity does certainly exist. I must confess, however, that my own experience is that of all with whose views on the subject I am familiar, that it is no easy task to differentiate between pseudo-membranous croup and primary laryngeal diphtheria. This fact is illustrated in Case VI reported herewith. In this case I was as careful as I could be in my efforts at making a diagnosis, and had the assistance of several other physicians, and yet the results, much to my sorrow and chagrin, showed that we were mistaken.

To summarize and abbreviate as much as possible, the clinical differences consist in about the following points, viz :

1. Membranous croup usually begins in the larynx, and the fauces are but slightly if at all effected.

An examination of the fauces in a vast majority of these cases reveals nothing. There may be very little increased redness and almost no swelling.

2. Croup is not infectious.

I have attended, and so have many others, case after case of pseudo-membranous laryngitis in which there was every reason to expect other children to contract the disease if it were contagious, and yet no such result has followed. This point is well illustrated in the following cases, with the exception of one in which an error of diagnosis is admitted. It is said by Dr. J. C. Wilson in Pep-

per's *System of Medicine*, that cases of tonsillar diphtheria also occasionally run their course without infecting others, though there may be exposure of susceptible persons. But it is admitted that diphtheria is an infectious disease, and the instances of escape of susceptible persons are exceptional; whereas, in the experience of the physicians of this city, at least, the rule in membranous croup is that the affection is non-infectious, and susceptible persons are exposed with impunity.

3. Croup has none of the serious asthenic symptoms of diphtheria.

All the serious symptoms which arise in croup are due to the obstruction of respiration, and therein alone lies the danger.

4. Croup is not followed by paralysis.

In contradiction of this statement, Mackenzie says that the reason for this is that about all cases terminate fatally, but in those cases which recover paralysis does occasionally occur. His article was written before intubation was extensively done, and consequently there were but few recoveries. Since then many cases have been saved by this operation; but I have learned of but few cases of paralysis within my own experience or that of others, and in those cases we are willing to admit that the disease was probably diphtheric, for it must be borne in mind that we do not assert that cases of pseudo-membranous laryngitis are never diphtheric and that we are painfully conscious of the difficulties of diagnosis.

5. Croup is a sthenic disease, while diphtheria is adynamic.

## 6. Croup is a local disease.

Whether diphtheria is first local and then general, or *vice versa*, is still a disputed point, but it is a fact that it is ultimately constitutional. No such statement substantiated by sufficient proof can be made in regard to croup.

7. The lymphatic glands are not affected in croup, but are enlarged in diphtheria.

This is explained by Mackenzie and others, by citing the well-known fact that there is no communication between the mucous membrane of the larynx and the superficial cervical glands.

8. There is no albuminuria in pseudo-membranous croup.

I am sorry the urine was not examined in all of the cases here reported, but this paper was not contemplated at the time the cases were under observation. The examination was made in only one case, and that was diphtheric, and showed a quantity of albumin.

While, then, on these grounds of bacterial and clinical difference, we argue the non-identity of the two diseases, it must still be admitted that it is very difficult and, in many cases, impossible to diagnose between cases of primary laryngeal diphtheria and pseudo-membranous croup. One of the cases here reported shows this difficulty, for after being carefully examined by several physicians and pronounced pseudo-membranous croup, subsequent events proved it to be diphtheric. This difficulty of diagnosis is spoken of by most authors, and in fact, is used as an argument for the identity of the two diseases.

This difficulty of diagnosis being true and an admitted fact, I fully indorse the action of the New York Board of Health in designating all cases of croup diphtheric, as being the safest method under the circumstances for the avoidance of possible risk of contagion. In fact, I would urge upon all, in view of my own experience, the propriety of isolating all cases of croup, and in future I shall certainly do so myself, though this is not an admission of the identity of the two diseases, but only a confession of the difficulty of diagnosis.

For the purpose of illustrating some of the points enumerated, namely, the non-contagiousness of croup, clinical history, pathology, difficulties of diagnosis, and also the results of treatment, I call attention to the following cases :

CASE I.—Daughter of Geo. G., aged six years. The brother had died a week or ten days previously of diphtheric croup. She had no deposit on the fauces, and I do not recall any glandular enlargement; nevertheless, considering that her brother had died of diphtheric croup a few days before, I felt justified in pronouncing her case also diphtheric croup. There was no fetor of the breath, such as usually occurs in diphtheria, nor was the constitutional disturbance in any way different from what we would expect in a case of pseudo-membranous laryngitis. The usual remedies failed, and I attempted intubation with the assistance of Dr. Watson. The operation was a complete failure. At that time I thought it was on account of loose membrane filling the tube, thus interfering with respiration, but now I believe it was want of skill in introducing the tube, and have my doubts whether it was



in the windpipe at all. It was my first case of intubation, and I have learned a good many things about the operation since.

CASE II.—A son of John C., aged seven years, was taken with symptoms of croup, and the disease rapidly developed, so that there was no difficulty in diagnosing his disease as membranous croup. There was no offensive odor of the breath nor glandular enlargement, and the constitutional disturbance was mild, the temperature not running much above 101° or 102°. His brother played around him, kissing him and inhaling his breath, and in fact no effort was made to keep them separated, nor were any disinfectant measures used. His brother and some other children who were allowed the freedom of the sick room without restraint did not take the disease, nor did any of them have the least sore throat. I was somewhat anxious to know whether they did or not, and so kept myself informed in regard to all who came in contact with the patient. With the assistance of Dr. Armstrong I attempted intubation in this case. Whether the tube was in the larynx or not I am not prepared to say, for at that time my knowledge of the landmarks was not very accurate. But this I do know, that with a mighty effort he coughed up the tube and with it a membrane several inches long and a perfect cast of the windpipe. He died, however, of exhaustion the next day. In this case, as in case No. 1, the operation was too long delayed even if skilfully performed, to be of any service, deep cyanosis having occurred and mucous rales being distinctly heard over the lungs in both cases.

CASE III.—A Russian Jewish boy (son of A. S.), aged five years, deaf and dumb, was taken with croup-symptoms, and Dr. Watson being called, diagnosed the case as one of membranous croup. I saw the child the next day with the doctor and

confirmed his diagnosis. We intubated him, and he recovered. No precautions were taken to keep the other children away, and the surroundings were the most unhygienic that can be imagined. Though other children had free access to him no other cases occurred in the family or neighborhood. A peculiar accident happened in this case. The little fellow being deaf and dumb could not be made to understand that he was not to disturb the string, and in some way he managed to chew the string off and finally to get the tube into the esophagus and swallow it, passing it by the rectum some days after. That it was really in the windpipe is proved by several circumstances. The breathing was much improved after its introduction, and he had the peculiar metallic ring in his voice. He vomited before he was put to bed, so that if the tube had been in the esophagus, instead of in the windpipe, he would certainly have thrown it up. While the tube was in position with the string fixed to his ear he was given liquid food, which he swallowed easily, and this he could not have done had the tube been in the gullet. I mention this accident, as it was a peculiar one and because it had afforded some amusement to my friends. I was especially chagrined at it, as it was my first case of intubation in which the patient recovered.

CASE IV.—A daughter of Charles G., aged four years, was taken sick with vomiting and fever, and the parents thought also sore-throat. I was called to see her in the evening and found the child asleep on the mother's lap. When I attempted to examine her throat she struggled and resisted so that I could not see what her condition was. I intended to see her the next day, but the father came to see me and said she was up and running around and that I would not need to call. On the fourth day of her illness, however, he came to see me again and said

that she had lost her voice, and, immediately suspecting the case to be one of true croup, I at once went to see her. I found her running around the room, apparently well, except that she had lost her voice. An examination showed that she was suffering with diphtheric croup, the fauces and tonsils being covered with the membrane. She was immediately put to bed and a very serious prognosis given. She was isolated from the rest of the family and given mercuric chlorid and tincture of ferric chlorid, and a spray of bichlorid was also used. On the fifth day respiration was so much interfered with that with the assistance of Dr. Watson I intubated with the most gratifying results, the little one getting so much relief that she herself said "I'm better." The tube remained in place and gave every satisfaction until the seventh day (two days) when it became filled with membrane and mucus, and after a while was expectorated along with shreds of membrane. The respiration again becoming labored the tube was re-introduced, with complete relief of the dyspnea, but the child died on the following morning, not from interference with respiration, but from the toxemia of the diphtheric poison.

CASE V was a son of S. E., aged five years, seen by Dr. Watson, and a diagnosis of pseudo membranous laryngitis was without difficulty made. I saw the case in consultation on the next day, and did not hesitate to confirm the diagnosis, and that evening performed intubation. The tube remained in place for four days, during which time there were no untoward symptoms, the little fellow feeling well, and expressing a frequent desire for something to eat and making a complete recovery. There was no effort at isolation, and though other children had frequent communication with him no other cases developed.

CASE VI.—A son of G. W. B., aged four years,

had been sick two days previously to my visit, with croupy symptoms and fever, but had not complained of sore-throat, nor was there any enlargement of the cervical glands. There was no especially offensive odor to the breath, but on inspection of the fauces there was distinctly visible a small white patch or pseudo-membrane on the posterior and inferior aspect of each tonsil. The systemic disturbance was slight, the temperature being  $103^{\circ}$  in the axilla, and digestion and appetite not more impaired than would be expected with such a febrile reaction. I am now convinced that I made a mistake in diagnosis when I pronounced the case one of membranous croup. No precautions were taken to prevent the other children from having access to the boy, and the consequence was that several cases of diphtheria of a mild type, and one of diphtheric croup, to be referred to again, followed this case in the same family. My only justification is that the case was seen by a number of other physicians, and the diagnosis was confirmed by all. It certainly was not secondary to faucial diphtheria, and was so mild in all the symptoms, except those of obstruction, that it was difficult to realize that it was actually a case of diphtheric croup affecting primarily the larynx. The interference with respiration was so marked and continuous that in the presence of a number of physicians I intubated him. He was given tincture of ferric chlorid and mercuric chlorid, and allowed to inhale the vapor of slaking lime. The tube remained in place for four days, the temperature gradually fell, and as there were no contradicting symptoms the tube was removed at the end of this time, and with the exception of the fact that about this time he developed measles, through which he had to pass in the usual way, he made an uninterrupted recovery.

CASE VII.—A son of W. H., aged seven years,



was seen by Dr. Watson on April 29th. An inspection of the fauces revealed diphtheric membrane covering the tonsils and palate, and this with the interference of respiration, loss of voice, rapid feeble pulse, and temperature of  $103^{\circ}$ , made it very easy to diagnose the case as one of diphtheric croup. The boy had been sick less than twenty-four hours when the physician was called, and at that time he was croupy, so that the probabilities are that the membrane was formed previously in the larynx, or at least at the same time that it formed in the fauces. The child was completely isolated from the other children of the family, and no other cases followed. He was given the usual course of treatment, but it proved of no avail, and two days after he became ill the obstruction to respiration made it necessary to intubate, which we did successfully and with complete relief to his breathing. The tube used, however, was too small, and he coughed it out about six or eight hours afterward. A larger one was introduced and remained. A few days afterward he developed measles with catarrhal pneumonia, from which he died four days after intubation. The breathing was not in the least obstructed, and he died just as he would have done from pneumonia unaccompanied by croup.

CASE VIII.—A son of A. F., aged twelve years, showed croup-symptoms, and Dr. Corson, of Charleston, was called. The boy had a moderate elevation of temperature, no swelling of the cervical glands, no offensive odor of the breath, and no deposit of membrane on the fauces. Dr. C., who is a strong advocate of the diphtheric origin of all these cases, confessed that this was different in its clinical features from the cases of diphtheric croup which he had seen before. When called in consultation with him I fully agreed in the diagnosis of pseudo-membranous croup. Obstruction to respiration had become

so serious that it had been feared he would not be kept alive until I should arrive, and so we proceeded with intubation. The child made a complete recovery, and in four days the tube was removed. He was not isolated, and, so far as I know, no other cases can be attributed to him as the source of infection, though there was ample opportunity if the disease had been contagious. A peculiarity of this case was the age of the patient. He was the oldest child I ever saw with pseudo-membranous croup. Cases at this age are certainly very rare.

CASE IX.—A son of R. C. H., aged six years, was taken with symptoms of catarrhal croup some two weeks after an attack of measles. He had been sick several days when his father came to me for some croup-medicine, never thinking of membranous croup, but incidentally and rather accidentally remarked that the little fellow had lost his voice. My suspicions were at once aroused, and on visiting him my fears were confirmed, though I had some difficulty at first in deciding between catarrhal and pseudo-membranous croup. There was no deposit in the fauces. The temperature was  $101^{\circ}$  under the tongue. The boy was given tincture of ferric chlorid and mercuric chlorid, with inhalations of lime-water and carbolic acid. He was not isolated, and his sister played with him, and once I found her lying beside him. Other children also were admitted to the room. No other cases followed. Obstruction to respiration became so alarming that intubation became necessary on the third day after I was called, which I performed with the assistance of Dr. Watson and my student, Mr. Salmon. Rapid recovery ensued.

CASE X.—This was the youngest child I think I ever saw with membranous croup, being only sixteen months old, small for its age, and of a strumous diathesis. The parents not appreciating the gravity of

the disease had neglected it till the last minute. With the assistance of Drs. Watson and Lichten-thaler I intubated, but not without a good deal of difficulty. When I saw the child a few hours after-ward its temperature was  $105^{\circ}$  in the groin, and while respiration was not obstructed, it breathed 74 times a minute. It died seven hours after intubation, but, much to the parents' satisfaction, was relieved of the dyspnea.

CASE XI was a son of G. W. B., aged two years. This is the case referred to in reporting Case V, and occurred in the same family just two months later. In the meantime, however, there had been several cases of diphtheria of a mild type in the family, and I had urged the isolation of the affected children without avail, though as the original source of the disease was an old partly filled well into which the wash water and refuse were thrown, and which communicated with the house by a pipe, and which I had tried in vain to have removed, they would probably have taken the disease even if they had been isolated. This child when first seen had faucial diphtheria, but no symptoms of croup. After a few days' illness, however, he began to be croupy, and his voice was markedly changed. On "flood Monday" he became so croupy and his respiration so labored that intubation was necessary. The house being surrounded by water, Dr. Watson and I got into a boat, went out, and performed the operation. On the fourth day after intubation rales were heard all over the lungs, and little air seemed to enter the vesicles. I thought that possibly the tube was filled with mucus and membrane, and removed it, but without relief, and the child died the same evening. Evidently the deposit had extended to the bronchial tubes, and I have no doubt even into the smaller ones.

On analysis of the foregoing cases, we find that five were diphtheric and six were not, and that in all except one of the former isolation was enforced so that no other cases developed from them ; but in the latter, in those cases diagnosticated as membranous croup, no effort was made to keep other children away, and yet in no case except the one referred to as a mistake in diagnosis did any other children contract the disease or any sore-throat, though in every instance there was exposure of susceptible persons. On this fact, as well as the clinical history, is based the supposition that the diagnosis in these cases was correct. The one case in which a mistake was made I now believe could have been diagnosticated properly if due importance had been attached to the small speck of membrane on each tonsil. Though it was not larger than a grain of wheat, I believe such a deposit is almost diagnostic of diphtheria, for as far as I can now recall I think I never saw a deposit on the tonsils in pseudo-membranous croup.

Clinically, it may be noticed that in these six cases of membranous croup there was no deposit of membrane in the fauces, a fact which seems a strong argument in favor of the diagnosis, and especially so when we recall that in 156 cases of laryngeal diphtheria referred to by Dr. Northup, in only one was the membrane in the larynx alone, showing the great tendency to spread to adjoining parts in diphtheria as contrasted with the local tendency of membranous croup.

Of the five cases that recovered not one had paralysis of any kind.



Of those cases that recovered only one was an example of diphtheric croup, and of those that died all but one was diphtheric, the remaining one dying from a late operation in an enfeebled child of extreme youthfulness.

In closing, I wish to make a few remarks on the value of intubation in these cases.

O'Dwyer estimates that one child in ten gets well of membranous croup, whether diphtheric or pseudo-membranous, under medical treatment, but from my own experience and that of others with whom I have been intimately enough associated to know of their experience, I am convinced that when obstruction does really exist, when there is a pseudo-membrane actually formed, this percentage of recoveries is too high. And moreover I am convinced that when recovery does occur it is more by the accidental removal of the obstruction or by the *vis medicatrix naturæ* than by the potency of any drug or plan of medical treatment we can select. But even admitting that one in ten recovers, the mortality is still woefully high, and anything that will reduce it is certainly to be sought after most diligently. Intubation has reduced the mortality to 26.77 per cent., or roughly estimated, about one in four recovers after this operation, which is quite a fall in the death-rate, as is readily perceived; but I believe as the operation becomes better known, and is consequently not held in reserve to be used as a last resort, but, on the other hand, is performed early, the mortality will be still greatly lessened.

If we refer to the cases here reported and exclude the first two cases, which should not be included be-

cause they were not (for the want proper skill) intubated at all, and should not, therefore, be included in the intubations, we see that five of the nine cases intubated recovered, 55.5 per cent., or more than double the proportion of successful operations as published in the books. Of course, the number is too small to make the results of much statistical value, as the next series of cases may reduce this favorable showing considerably, but I attribute the results to the fact that in all cases an operation was urged as soon as the obstruction became very decided and before the cyanosis became too pronounced. I believe that one of the cases (Case X) would at least have stood a better chance for recovery had I seen it earlier, notwithstanding its extreme youthfulness, being only sixteen months old, and of a strumous diathesis. I saw it only nine hours before death, and it died seven hours after intubation.

Even in the cases in which intubation failed to cure, only in one case did it fail to give relief, relief most gratifying to parents and attendants, and no doubt, still more gratifying to the little sufferer. In the case in which it thus failed to relieve I am satisfied tracheotomy would also have failed, as it was quite evident the membrane had extended to the bronchial tubes, and, it seemed, also into the smaller branches.

One of the great advantages of intubation is the willingness of parents to permit it, and if physicians would be less afraid to propose it I am sure there would be more early operations, and consequently more recoveries.



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